

WHAT IS CLAIMED IS:

1. A dielectric resonator comprising:

a substantially rectangular parallelepiped dielectric block;

a plated through hole defining a resonant frequency of the dielectric resonator arranged inside the dielectric block, the through hole having a L-shaped configuration and extending from a first surface of the dielectric block to a second surface of the dielectric block which is perpendicular to the first surface;

an outer conductor formed on outer surfaces of the dielectric block in such a manner that one end of the plated through hole is spaced from the outer conductor to define an open-circuited end of the plated through hole and the other end of the plated through hole is connected to the outer electrode to define a short-circuited end thereof; and

an outer coupling electrode electrically connected to the open-circuit end of the plated through hole.

2. A dielectric resonator according to Claim 1, wherein the outer coupling electrode is directly coupled to the plated through hole.

3. A dielectric resonator according to Claim 1, wherein the outer coupling electrode is capacitively coupled to the plated through hole.

4. A dielectric resonator according to Claim 1, wherein the plated through hole has two linear sections extending perpendicular to one another, the cross-sectional configuration of the two sections being different from one another.

5. A dielectric filter comprising the dielectric resonator according to Claim 1 further comprising input/output means electrically coupled to the plated through hole.

6. A dielectric resonator comprising:

a dielectric block having first and second outer surfaces which are perpendicular to one another;

a plated through hole defining a resonant frequency of the dielectric resonator arranged inside the dielectric block, the through hole having a bent configuration and extending from the first surface of the dielectric block;

an outer conductor formed on outer surfaces of the dielectric block in such a manner that one end of the plated through hole is spaced from the outer conductor to define an open-circuited end of the plated through hole and the other end of the plated through hole is connected to the outer conductor to define a short-circuited end thereof; and

an outer coupling electrode electrically connected to the open-circuited end of the plated through hole.

7. A dielectric resonator according to Claim 6, wherein the outer coupling electrode is directly coupled to the plated through hole.

8. A dielectric resonator according to Claim 6, wherein the outer coupling electrode is capacitively coupled to the plated through hole.

9. A dielectric resonator according to Claim 6, wherein the plated through hole has two linear sections extending perpendicular to one another, the cross-sectional configuration of the two sections being different from one another.

10. A dielectric filter comprising the dielectric resonator according to Claim 6, further comprising input/output means electrically coupled to the plated through hole.

11. A dielectric filter comprising:

a dielectric resonator including a substantially rectangular parallelepiped dielectric block, a plurality of L-shaped plated through holes defining a resonant frequency of the dielectric resonator arranged inside the dielectric block, each of the through holes extending from a first surface of the dielectric block to a second surface of the dielectric block which is perpendicular to the first surface, an outer conductor formed on outer surfaces of the dielectric block in such a manner that one end of each of the plated through holes is spaced from the outer conductor to define a respective open-circuited end of the plated through hole and the other end of each of the plated through holes is connected to the outer conductor to define a short-circuited end thereof; and

input/output means;

wherein the open-circuited ends of the plated through holes are adjacent to each other to mutually couple resonators formed by the plated through holes.

12. A dielectric filter according to Claim 11, further comprising resonator-coupling electrodes formed at the open-circuited ends of the plated through holes to mutually couple the plated through holes to one another.

13. A dielectric filter according to Claim 12, wherein each of the plated through holes has first and second linear sections which meet at an angle, the inner diameter of the first section of each through hole being larger than the inner diameter of the second section of each through hole, the first section extending to the open circuited end of the through hole, the second section extending to the closed circuited end of the through hole.

14. A dielectric filter according to Claim 12, wherein the input/output means comprises an outer coupling electrode isolated from the outer conductor and an excitation hole having an inner electrode conducted to the outer coupling electrode.

15. A dielectric duplexer comprising the dielectric filter according to Claim 12, the duplexer comprising a plurality of pairs of the dielectric filters.

16. A dielectric duplexer comprising the dielectric filter according to Claim 11, the duplexer comprising a plurality of pairs of the dielectric filters.

17. A dielectric duplexer comprising the dielectric resonator according to Claim 4, the duplexer comprising a plurality of pairs of the dielectric resonators.

18. A dielectric duplexer comprising the dielectric resonator according to Claim 1, the duplexer comprising a plurality of pairs of the dielectric resonators.

12. 19. A communication apparatus comprising the dielectric filter according to Claim

Claim 19. 20. A communication apparatus comprising the dielectric duplexer according to

11. 21. A communication apparatus comprising the dielectric filter according to Claim

Claim 21. 22. A communication apparatus comprising the dielectric duplexer according to

Claim 4. 23. A communication apparatus comprising the dielectric resonator according to

Claim 23. 24. A communication apparatus comprising the dielectric duplexer according to

Claim 1. 25. A communication apparatus comprising the dielectric resonator according to

Claim 25. 26. A communication apparatus comprising the dielectric duplexer according to